1   CLAIMS

2

3   1.   A method including

4   executing, on a computing device, an autonomous software element, said

5 autonomous software element having access to information about a plurality of gene ex-

6 pression values;

7   generating, in response to said information, a hypothesized relationship

8 about genes associated with said gene expression values, said hypothesized relationship

9 having the properties of being (1) relatively unlikely to be due to chance, and (2) rela-

10 tively likely to be of interest to at least one agent other than said autonomous software

11 element;

12   sending information about said hypothesized relationship to said at least

13 one agent.

14

15   2.   A method as in claim 1, including collecting said information from a

16 plurality of relatively nonlocal databases.

17

18   3.   A method as in claim 1, including collecting said information from

19 at least one relatively nonlocal database.

20

21   4.   A method as in claim 1, wherein generating includes

22   selecting a first set of genes in response to said gene expression values;

1   selecting a second set of genes in response to data other than said gene ex-

2   pression values;

3   applying a statistical technique to said first set and said second set; and

4   confirming said hypothesized relationship in response to applying said sta-

5   tistical technique.

6

7   5.   A method as in claim 1, wherein generating includes

8   selecting a set of genes in response to said gene expression values;

9   comparing the frequencies of the nucleotide sequences upstream from said

10   set of genes to the frequencies of the nucleotide sequences upstream of genes not in said

11   set; and

12   constructing a hypothesis that is responsive to sequences that have an

13   anomalous frequency distribution.

14

15   6.   A method as in claim 1, wherein generating includes

16   examining pathways of genes with respect to gene activation sequences;

17   extending said pathway using said gene expression information; and

18   constructing a hypothesized relationship concerning an extension of said

19   pathway.

20

21   7.   A method as in claim 1, wherein generating includes

1   evaluating correlation values with respect to an identified gene or gene se-

2   quence so as to determine variations in the behavior of said identified gene or gene se-

3   quence; and

4   confirming said hypothesized relationship in response to applying said sta-

5   tistical technique.

6

7   8.   A method as in claim 1, including

8   rating said hypothesized relationship with a measure of interest by said

9   agent; and

10   determining whether to send said information such that said determination

11   is responsive to said measure.

12

13   9.   A method as in claim 8, including

14   determining a threshold in said measure of interest; and

15   sending said information in a manner responsive to said threshold.

16

17   10.   A method as in claim 8, wherein said measure of interest is periodi-

18   cally reevaluated.

19

20   11.   A method as in claim 8, wherein said measure of interest is respon-

21   sive to whether said hypothesized relationship is relatively simple and relatively unlikely

22   to be due to chance, or whether said hypothesized relationship relates to at least one of:

1   genes one or more researchers have indicated they are interested in, genes for which there

2   are published papers, selected domain-specific knowledge about gene expression.

3

4   12.   A method as in claim 1, wherein said autonomous software element

5   has access to collateral information other than gene expression values.

6

7   13.   A method as in claim 12, wherein said collateral information in-

8   cludes at least one of: information about interests of said at least one agent, information

9   about published papers, information about researchers, information about relationships

10   between genes.

11

12   14.   Apparatus including

13   memory recording information about a plurality of gene expression values;

14   an autonomous software element disposed on a computing device, said

15   autonomous software element having access to said memory;

16   said memory recording information about a hypothesized relationship be-

17   tween said gene expression values, said hypothesized relationship having the properties

18   of being (1) relatively unlikely to be due to chance, and (2) relatively likely to be of inter-

19   est to at least one agent other than said autonomous software element;

20   a communication link coupled to said memory and capable of sending in-

21   formation about said hypothesized relationship to said at least one agent.

22

1   15.   Apparatus as in claim 14, wherein said communication link is capa-

2 ble of collecting said information from a plurality of relatively nonlocal databases.

3

4   16.   Apparatus as in claim 14, wherein said communication link is capa-

5 ble of collecting said information from at least one relatively nonlocal databases.

6

7   17.   Apparatus as in claim 14, wherein

8   said hypothesized relationship includes (a) information about a first set of

9 genes, said first set of genes having been selected in response to said gene expression

10 values, and (b) information about a second set of genes, said second set of genes having

11 been selected in response to data other than said gene expression values;

12   said hypothesized relationship has been confirmed in response to a statisti-

13 cal technique applied to said first set and said second set.

14

15   18.   An apparatus in claim 14, including

16   a means for selecting a first set of genes in response to said gene expression

17 values;

18   a means for selecting a second set of genes in response to data other than

19 said gene expression values;

20   a means for applying a statistical technique to said first set and said second

21 set; and

1   a means for confirming said hypothesized relationship in response to ap-

2   plying said statistical technique.

3

4   19.   An apparatus as in claim 14, including

5   a means for selecting a set of genes in response to said gene expression val-

6   ues;

7   a means for comparing the frequencies of the nucleotide sequences up-

8   stream from said set of genes to the frequencies of the nucleotide sequences upstream of

9   genes not in said set; and

10   a means for constructing a hypothesis that is responsive to sequences that

11   have an anomalous frequency distribution.

12

13   20.   An apparatus as in claim 14, including

14   a means for examining pathways of genes with respect to gene activation se-

15   quences;

16   a means for extending said pathway using said gene expression informa-

17   tion; and

18   a means for constructing a hypothesized relationship concerning an exten-

19   sion of said pathway.

20

21   21.   An apparatus as in claim 14, including

1   a means for evaluating correlation values with respect to an identified gene

2   or gene sequence so as to determine variations in the behavior of said identified gene or

3   gene sequence; and

4   a means for confirming said hypothesized relationship in response to ap-

5   plying said statistical technique.

6

7   22.   Apparatus as in claim 14, said memory including

8   information associating said hypothesized relationship with a measure of

9   interest by said agent; and

10   a software comparator coupled to said said measure of interest and to a se-

11   lected threshold.

12

13   23.   Apparatus as in claim 14, wherein said autonomous software ele-

14   ment has access to collateral information other than gene expression values.

15

16   24.   A memory recording information including instructions, said in-

17   structions interpretable by a computing device, said instructions including

18   an autonomous software element having access to information about a plu-

19   rality of gene expression values;

20   a first software element coupled to said information and capable of gener-

21   ating a hypothesized relationship between said gene expression values, said hypothesized

22   relationship having the properties of being (1) relatively unlikely to be due to chance, and

1   (2) relatively likely to be of interest to at least one agent other than said autonomous

2   software element;

3   a second software element coupled to information about said hypothesized

4   relationship and capable of sending information about said hypothesized relationship to

5   said at least one agent.

6

7   25.   A memory as in claim 24, including

8   information about a first set of genes selected in response to said gene ex-

9   pression values;

10   information about a second set of genes selected in response to data other

11   than said gene expression values;

12   information about said hypothesized relationship selected in response to

13   applying a statistical technique to said first set and said second set.

14

15   26.   A memory as in claim 24, wherein generating includes

16   information about selecting a first set of genes in response to said gene ex-

17   pression values;

18   information about selecting a second set of genes in response to data other

19   than said gene expression values;

20   information about applying a statistical technique to said first set and said

21   second set; and

1   confirming said hypothesized relationship in response to applying said sta-

2   tistical technique.

3

4   27.   A memory as in claim 24,

5   information about selecting a set of genes in response to said gene expres-

6   sion values;

7   information about comparing the frequencies of the nucleotide sequences

8   upstream from said set of genes to the frequencies of the nucleotide sequences upstream

9   of genes not in said set; and

10   information about constructing a hypothesis that is responsive to sequences

11   that have an anomalous frequency distribution.

12

13   28.   A memory as in claim 24, including

14   information about examining pathways of genes with respect to gene acti-

15   vation sequences;

16   information about extending said pathway using said gene expression in-

17   formation; and

18   information about constructing a hypothesized relationship concerning an

19   extension of said pathway.

20

21   29.   A memory as in claim 24,

1   evaluating correlation values with respect to an identified gene or gene se-

2   quence so as to determine variations in the behavior of said identified gene or gene se-

3   quence; and

4   confirming said hypothesized relationship in response to applying said sta-

5   tistical technique.

6

7   30.   A method including

8   executing, on a computing device, an autonomous software element, said

9   autonomous software element having access to information about concerning a set of

10   genes and proteins;

11   generating, in response to said information, a hypothesized relationship in-

12   volving at least one of the following: a set of proteins, SNPs or chemicals pertaining to

13   said information;

14   sending information about said hypothesized relationship to said at least

15   one agent.

16

17   31.   A method as in claim 30, including collecting said information from

18   a plurality of relatively nonlocal databases.

19

20   32.   A method as in claim 30, including collecting said information from

21   at least one relatively nonlocal database.

22

1   33.   A method as in claim 30, including

2   rating said hypothesized relationship with a measure of interest by said

3 agent; and

4   determining whether to send said information such that said determination

5 is responsive to said measure.

6

7   34.   A method as in 30, including

8   determining a threshold in said measure of interest; and

9   sending said information in a manner responsive to said threshold.

10

11   35.   A method as in claim 34, wherein said measure of interest is periodi-

12 cally reevaluated.

13

14   36.   A method as in claim 34, wherein said autonomous software element

15 has access to collateral information.

16

17   37.   A method as in claim 34, wherein said collateral information in-

18 cludes at least one of: information about interests of said at least one agent, information

19 about published papers, information about researchers, information about relationships

20 between genes.